

CORRUGATED CARDBOARD SUPPORTS**DESCRIPTION**

The present invention relates to improvements in corrugated cardboard
5 supports, particularly but not exclusively, corrugated cardboard pallets.

Pallets are in everyday use and are usually made from wood, polythene, plastic
or metal. The pallets may be of a general size, such as those used in the retail and
retail goods manufacturing industries, or they may be made for specific applications.
10 Their chief purpose is to safely store goods or product in quantity and allow the goods
or product to be mechanically handled within manufacturing units. The pallets also
act as shipping units, often via vehicle transport, to the retail outlet. Again, at the
retail outlet the pallets are mechanically handled and stored prior to transport to
individual stores. The pallet may then be used to display the goods or product directly
15 on the shop floor, as a form of merchandising unit.

Pallets are normally of a high initial cost and there are systems of pallet hire in
place. Pallets may also be purchased second hand, but are again costly, and may be
prone to contaminants. They are bulky and are normally of a standard height and size
20 so that both the manufacturer and retailer storage systems are compatible. Wooden
pallets are heavy to manhandle and add to the crush weight of stored and transported
goods or product because often several pallets of goods or product are stored on top of
one another. A standard wooden pallet typically weighs between 25Kg and 50Kg.
This means that manhandling is difficult and the weight can damage the goods or

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product that the pallet rests upon. This type of pallet is also costly to transport because of its inherent weight.

A typical operation of a re-usable pallet may be as follows. Manufactured product such as boxed dry goods are collated and stacked on to a standard wooden pallet. A man may then place a pallet on top of this stacked pallet and proceed to collate and place more boxed product on top of this. Depending upon how many layers of product are used on each pallet, each single stack may contain several pallets. The stack is then normally enshrouded in stretch wrap to form a unit that is then mechanically handled by a manual pump truck or a mechanical fork lift truck and placed into storage. After a period of time, the product is ordered by a retailer and the unit is mechanically loaded onto a transport vehicle. At the retailer's depot, the unit is unloaded and stored for a further period. It is then loaded onto another vehicle and delivered into a retail shop, where it may be stored or placed direct for merchandising onto the shop floor.

The problem with the aforementioned operation is that the manufacturer does not get the pallet back. This is very costly to the manufacturer and, ultimately, the consumer. After the product or goods are used from the pallet, the retailer must then dispose of the wooden pallet, which is bulky and heavy. The disposal of the pallet requires expensive transport and is costly to the environment since most pallets end up in landfill. It is estimated that there are around 5 wooden pallets in existence for each person in the British Isles.

If a hire system is used, a pallet must be hired by a manufacturer. A system of tracking the pallets is required which is both labour intensive and costly. The pallet is then left with the retailer. The retailer may have a stock of empty pallets which he can give back to the manufacturer, requiring the loading of a vehicle to transport bulky, heavy and empty pallets back to the manufacturer at his own cost. A manufacturer also has to pay to de-hire a pallet and, if one is lost, will have to pay full cost for it. The returned pallets can be hired out again in a repeat cycle. Re-using pallets also leads to problems of cleanliness and repair. Wooden pallets are normally put together with nails which may become exposed and damage the goods or product placed upon them. Furthermore, wooden pallets may produce large or small splinters that can either damage the product or even enter and contaminate the product, especially food goods.

The standard height of most pallets, usually being about 160mm, dictates how much product can be transported on a vehicle, such as a curtain slider. Wooden pallets are heavy and may double in weight when wet, making manual handling dangerous.

The Applicant's co-pending Application No.s WO 03/082685 and WO 03/082688 provide a solution to the above problems by the provision of a collapsible corrugated cardboard support and pallet. Whilst these are entirely satisfactory for their intended purpose, in some instances, the customer may not require the pallet to be collapsible. In such situations, it is desirable to provide a cheaper, less complex corrugated cardboard pallet. However, it is difficult to provide a cardboard pallet that

has sufficient internal strength to withstand the weights that are applied to it and robust enough to withstand being mechanically handled and transported several times.

It is an object of the present invention to provide an improved corrugated
5 cardboard support that aims to overcome, or at least alleviate the abovementioned drawbacks.

It is a further object of the present invention to provide an improved
corrugated cardboard pallet that aims to overcome, or at least alleviate, the
10 abovementioned drawbacks.

Accordingly, a first aspect of the present invention provides a corrugated
cardboard blank for the construction of a support, the blank comprising two main
body forming panels, a middle panel between said body forming panels and two end
15 panels, each main body forming panel, middle panel and at least one of the end panels
having opposing end flaps.

The panels and flaps are separated from their adjoining panel or flap by means
of fold lines.

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It is to be appreciated that a support is assembled from the blank by folding
the appropriate parts of the blank and securing them together using suitable means,
most preferably an adhesive. Adjacent panels are folded substantially at right
angles to each other such that one of the end panels abuts the edge of the main body

panel to which it is not connected. Glue is then applied to the outer surface of this end panel and the opposing end panel is folded over this panel and secured thereto by suitable means. The end flaps of the panels making up the box are folded inwardly and secured to each other to form a closed box.

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The end panels of the blank are preferably substantially identical in size. In this manner, in the assembled box, the opposing end panel overlaps substantially all of the underlying end panel.

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It is preferable for fluting to be formed in the longitudinal direction of the blank, i.e. from one end panel to the other since this increases the strength of the box formed from the blank.

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Preferably, both end panels are provided with opposing end flaps. Preferably, each end flap is 25% to 50% of the height of its corresponding panel, more preferably 40 to 50%.

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The end flaps of the opposing end panel are preferably separated from the panel by reverse fold lines whereby, in the assembled box, the flaps may be folded outwardly and secured to the panel.

A second aspect of the present invention provides a corrugated cardboard support comprising two substantially parallel opposing main body panels and two

pairs of opposing side walls wherein at least one side wall is at least double the thickness of the main body panels.

The provision of at least one side wall that is at least double the thickness of the main body panels provides a support with inherent strength. In this respect, the main body forming panels receive the load and are supported by the side walls.

Preferably, the at least one side wall is double the thickness by the provision of a double layer of material. More preferably still, the overlapping outer layer is provided with end flaps for folding over and securing to the layer to increase the strength and thickness of the wall still further. It is preferable for one pair of opposing side walls that do not have double thickness to be formed from end flaps extending from the other side walls and the main body forming panels.

It is to be appreciated that the blank according to the first aspect of the present invention is preferably used in forming a support according to the second aspect of the present invention. Additionally, the main panels and walls of the support may be any desired size.

A third aspect of the present invention provides a corrugated cardboard pallet, the pallet comprising a top sheet, a base sheet and at least one connecting member between said top and said base sheets, the connecting member being formed from a blank according to the first aspect of the present invention or a box according to the second aspect of the present invention.

In a preferred arrangement, nine supports are provided between said top and base sheet, optionally being of different sizes. Preferably, the supports are arranged at each corner of the sheets, with a support positioned centrally between the corner
5 supports along each side thereof and a further support being provided in the centre between the sheets. Preferably, the support provided in the centre is the largest size of support and the supports provided at the corners are the smallest in size.

The base sheet is preferably provided with regions that are relieved of material
10 to provide access points from below the pallet. Preferably, two rectangular areas are relieved of material. Any suitable number of access points may be provided in the pallet, being formed through the base sheet and/or by the spacing between adjacent supports provided between the sheets of the pallet.

15 In a preferred embodiment of the present invention, the components of the pallet are secured together by means of adhesive only. A varnish may be applied to the top sheet, base sheet and/or supports to impart water resistance.

For a better understanding of the present invention and to show more clearly
20 how it may be carried into effect reference will now be made, by way of example only, to the accompanying drawings in which:

Figure 1 is a plan view of a blank for a box according to one embodiment of the present invention;

Figure 2 is a perspective view of a partially erected box according to the present invention assembled from the blank shown in Figure 1;

Figure 3 is a side plan view of the fully erected box shown in Figure 2;

Figure 4 is a plan view of a top part for a pallet according to one embodiment
5 of the present invention;

Figure 5 is a plan view of the base part for a pallet according to one embodiment of the present invention

Figure 6 is a perspective view of an assembled pallet according to one embodiment of the present invention utilising the parts shown in Figures 1 to 3, 4 and
10 5; and

Figure 7 is a view of the underside of the top part of the pallet showing the location of the boxes.

Referring to Figure 1 of the accompanying drawings, a plan view of a blank 2
15 for the construction of a support box according to one embodiment of the present invention is illustrated. The blank is cut from a sheet of corrugated cardboard and creases are inserted into the blank to provide fold lines, represented by the small broken lines in Figure 1. Heavy long broken lines denote reverse fold lines. The blank has two main body forming panels 4, 6 connected by a middle panel 8. The two
20 main body forming panels 4, 6 are each provided with an end panel 10, 12 respectively opposite said middle panel 8. Opposing free ends of each main body panel, middle panel and end panels are provided with end flaps 24, 26, 28, 30 and 32. All the flaps are separated from their respective panel by fold lines except for the end flaps of one of the end panels, which are separated by means of reverse fold lines.

Alternatively, these end flaps may be separated from their end panel by means of cut and crease lines which are known in the art. Fluting is provided in the longitudinal direction, as denoted by arrow C in Figure 1.

5 Any size of panels may be used depending upon the required size of box but, it is to be appreciated that all the panels are preferably of an identical length. The main body panels may be of a greater width than the middle and end panels, as shown in the drawings, with the main panels being identical and the middle and at least one of the end panels being of an identical size. Each end flap is preferably approximately
10 half the height of the panel to which it is attached.

To form the box 100 adjacent panels are folded substantially at right angles to each other such that one of the end panels 10 abuts the edge of the main body panel 6 to which it is not connected. Glue is then applied to the outer surface of this end
15 panel 10 and the opposing end panel 12 is folded over this panel and secured thereto by means of the glue, thereby resulting in this side of the box being of double thickness. The end flaps 24, 26, 28, 30 of the panels making up the box are folded inwardly (see Figure 2), with the end flaps of the end and middle panels being folded inwardly first and the end flaps of the main body panels being folded over these flaps
20 and secured thereto by means of adhesive to form a closed box. Additionally, the end flaps 32 of the end panel 12 are folded outwardly, as denoted by the arrow A in Figure 2, and adhered to the outer surface of their end panel, as shown in Figure 3.

The construction of the box 100 is such that it may withstand far greater weight than a standard cardboard box due to the provision of the additional end panel overlapping its opposing end panel and the end flaps which fold outwardly and are secured to the end panel. Such an arrangement has not previously been described since it would appear to be wasteful of material. However, in the present invention, the provision of an effectively triple-walled box has surprisingly been found to provide a support that is fit for its intended purpose.

Furthermore, it has been found that the provision of fluting in the longitudinal direction C, shown in Figure 1, provides for a much stronger box thus enabling the box to support greater weights. This is opposite to the direction of fluting provided in conventional corrugated cardboard boxes.

The box according to the present invention may be used as a support, for example acting as a display shelf to support goods that are for sale. The box has advantages over the prior art supports, such as being lighter to transport and its ability to be recycled. It is also made of cheap materials. The simple design of the blank that makes up the box provides a massive cost saving vis-à-vis the type of box described in the Applicant's co-pending Application No.s WO 03/082685 and WO 03/082688. Additionally, there is far less waste, with slits simply being cut into the machined blank.

A preferred application for a box according to the present invention is the construction of a pallet wherein a plurality of boxes are adhered to a top and bottom

sheet to provide a pallet that is cheap, lightweight and recyclable . Any required size of pallet may be provided and the larger the pallet, generally the more boxes that will be used in its construction.

5 Figures 4 to 7 of the accompanying drawings illustrate one pallet according to the present invention. This embodiment is made from eleven single sheets of corrugated cardboard, which are stamped out as shown in Figure 1, Figure 4 and Figure 5. A solid rectangular sheet 280 is provided to form the top of the pallet and a further rectangular sheet 290 of substantially the same size is provided for forming the
10 base of the pallet, this sheet having two rectangular sections 400, 420 that are relieved of material.

 Nine boxes 300 - 380 according to the present invention are glued in their erected form to the underside of the top sheet 280, as shown in Figure 7. This figure
15 details the location of the nine double blind boxes that create the compressive strength of the pallet. In the embodiment shown, there are four different sizes of box for each pallet. A smallest size of box 300, 320, 360, 380 is placed at each corner of the sheet. A largest box 34 is placed in the centre of the pallet. Another size of box 310, 370 is positioned centrally along two opposing faces of the pallet between the corner boxes
20 and yet a further size of box 330, 350 is placed centrally along the other two opposing faces of the pallet. Glue is then applied to the panel 4 of the boxes and the bottom sheet 290 of the pallet is then stuck onto the flattened boxes.

The orientation of the fluting on the top sheet may be any direction but the orientation of the fluting with respect of the boxes is important to provide overall compressive strength of the pallet. The positioning of the boxes is such as to provide access for a mechanical forklift along all four edges of the pallet. The boxes are also
5 positioned so that they will always be in the correct position to bear on standard warehouse racking systems. The mechanical handling forks can be introduced at A or B on either edge of the pallet, as illustrated in Figure 6. If a pallet truck is used for handling, then the wheels roll over the pallet base 290 and then sit against the floor as the pallet is elevated for moving.

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The absence of any metal mechanical fastenings means that the pallet cannot damage or contaminate any product or goods placed therein. Its reduced height vis-à-vis the conventional type of pallet means that extra product layers may be gained for transport. The cardboard may also be treated with varnish or other suitable means to
15 make it water resistant and may be printed with descriptors or other decoration, such as in for use in a shop display merchandising unit.

A pallet according to the present invention has clear economical and environmental benefits. A pallet according to the present invention may only be about
20 100mm high, being almost half the height of a standard wooden pallet but tall enough to enable handling by all standard mechanical means.

The pallet according to the present invention is designed for single trip use. Whilst the pallet is robust enough to be mechanically handled and transported several

times, it is envisaged that the pallet will be recycled after use. In this respect, the pallet is 100% recyclable. This saves on storage space and costly return transport. Furthermore, the pallet is far cheaper to make than other types of wooden pallet currently in existence, minimising the cost to the ultimate consumer.

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On average, a pallet according to a preferred embodiment of the present invention weighs about 1-3 Kg. In contrast, a conventional wooden pallet weighs between 25-50Kg. Thus, the present pallet can be manually handled without any worry of health and safety weight constraints. Its lightness also assists in the prevention of product damage when the pallet is used in multi-stacked units. It is designed for two-way or four-way entry and can be handled by a manual pallet pump truck or various mechanical forklift trucks without modification. The pallet is also designed so that it can be placed safely in the majority of racking systems.

15 A further benefit provided by a pallet according to the present invention is that its basic constructional design can be used to provide any size of pallet required. By varying the grade of corrugated cardboard used, the box or pallet can be made to withstand varying dead loads up to several tons.

20 Additionally, the provision of a pallet that is intended for a single use reduces the risk of any contamination of the product from the pallet. Wooden pallets require fumigation against wood boring insects. The single use aspect of the pallet also reduces incidental costs associated with the provision of manpower to control the pallets, clean the pallets and store and unload the pallets.

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